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**BIGHEAD IN SHEEP.**

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Bighead is a condition affecting sheep, and is characterized by a sudden swelling of the head and ears. There is present in the swelled portions of the head a straw-colored serum which often drips from the parts. The affected tissues present a gelatinous appearance, and the swelling is often so severe that the animal's vision is partially or entirely obscured. This, with a severe irritation of the head, causes the animal to be extremely restless and to walk aimlessly about until exhausted. This affection has not been found to be transmissible to other sheep or to experimental animals.

**HISTORY.**

Bighead has been observed by sheepmen for upwards of 30 years. Each flockmaster has a different theory regarding its cause, and many superstitious ideas are in existence. The affection is not very widely distributed. It has been reported and found in Utah and the surrounding States, the greatest losses occurring in southern and central Utah, southern Idaho, eastern Nevada, and western and southern Wyoming.

Bighead has not been described in other countries, so far as the author has been able to find, but fagopyrism (or buckwheat poisoning), which is similar in many respects to bighead, has been described by a number of European authors.

**CAUSES.**

The definite cause of bighead is not known, though it seems that climatic conditions have much to do with its appearance. Sheep are usually affected during the spring and early summer while being driven from the winter to the summer ranges, more commonly before shearing. Bighead seems to be most prevalent after a cold or stormy night when the day following turns hot with sunshine and the sheep are driven fast in the hot sun, and where they are com-

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NOTE.—This paper gives the results of investigations made by cooperation between the Utah Agricultural Experiment Station and the Bureau of Animal Industry of the United States Department of Agriculture.



pelled to inhale considerable alkali dust. It affects males and females alike, though it is seldom seen in young lambs. This condition seems to affect sheep in much the same way as man is affected by poison ivy. The disease does not seem to be transmissible from one sheep to another or to other animals. All experiments with transfusion of blood or injection of serum from the affected sheep to well ones were without results.

Thinking that probably it was due to some of the forage plants on which the affected sheep had existed some time prior to the outbreak, a number of them were gathered and fed experimentally to the sheep, then the animals were exposed in much the same way as bands are driven over the country where they contract this trouble, but in no case was bighead produced. Buckwheat was also fed in both the green and the dry state to a number of experimental sheep for different periods of time, then they were exposed to the hot sun, but none of the conditions described by the European writers were produced. There are a number of forage plants which belong to the buckwheat family that sheep eat on the desert and on different parts of the trail, and it could be possible that this trouble may come from that source, but the author has been unable to locate it; nor was he able to find any kind of a germ responsible for the malady. Sheep with bighead were locked up with healthy ones and compelled to eat and drink with them—in fact, they were exposed in every way possible, even inoculated with all of the body fluids, but in no instance was the disease transmitted from an affected to a healthy sheep.

It has been stated by many that the impoverished condition of many of the range sheep brought on bighead, but in the writer's experience sheep that were well nourished were attacked as readily as the extremely poor ones. It is possible that there is something pertaining to the lymph drainage from the head of the sheep that we do not understand, or there may be something in the blood or locally causing an exaggerated passage of fluid through the tissues. It seems that the tissues lose their proper elasticity and their muscular movements are not normal, thus not allowing the fluid from the head to continue on its journey toward the body.

#### SYMPTOMS.

The first noticeable symptom is that the animal begins to throw its head up and sidewise in a jerking motion. It seems to be greatly irritated, as it shakes the head and tries to rub it. The animal walks aimlessly through the flock, often stamping its feet on the ground, very seldom standing still for any length of time. The eyesight seems to be affected, as the animal follows a direct line, some-

times running into other sheep and objects in its path. One is naturally led to believe that there must be brain symptoms or inflammation developing, as the animal often behaves as in regular mania. In this condition some of the sheep wander away from the flock and are lost, either dying as a result of exhaustion and starvation or becoming a prey to coyotes.

If the animal is closely watched after the jerking of the head begins, one can see the ears turning red in color and enlarging. Nearly at the same time the cheeks show the same congested appearance, and these parts continue enlarging to enormous proportions, the ears drooping as a result of their weight. After these swellings are about complete, small drops of serum of a light-yellow color begin to exude from them. The entire face becomes swollen to such a degree as to close the eyes, and in some cases the internal pressure of the serum is so great as to force the eyeballs out of their sockets. Fever is always present and shows itself early, the temperature ranging from  $104^{\circ}$  to  $107^{\circ}$  F. In the severe forms this occurs in about from 30 minutes to one hour's time. The vision being obstructed the animal can not see the food it should eat, and the lips, cheeks, and tongue being so badly congested, the animal could not eat if it wanted to. In many cases the tongue fills the mouth completely. In some cases there is a disturbance of the breathing, due to pressure on the trachea and inflammation of the air passages. This may be due to some extent to excitement, and when in this condition the sheep, if allowed to, will continue to chase around until completely exhausted, and will then lie down, usually never to rise. Others that are only slightly affected may make a recovery. The skin often peels off the swelled areas, many animals losing the wool over the entire body. Sheep once affected are never as good as formerly, as they seem to be unthrifty. Many of the ewes that carry lambs lose them.

#### LESIONS.

Sheep killed during the early stages of the disease show petechiæ (purplish spots) in the nostrils and all tissues of the head, trachea, and lungs. The eyeballs, cheeks, the space between the jaws, and the ears are infiltrated with a serous fluid which becomes gelatinous, making the skin over these parts appear like a soft, thick cushion with some serum exuding. This cushion may become hardened, and later the skin cracks and fissures appear in the affected parts, and a gelatinous exudate is found under the mucous membranes in the mouth and the tongue. Where sheep die as a result of this condition, this gelatinous material is found in different parts of the body under the mucous and serous membranes and in some of the muscles. There are often small hemorrhagic spots along the intestinal tract and



around the kidneys. There is a congestion and thickening of the walls of the lymphatics, with a swelling of the lymph glands. The circulation from the head was in many instances nearly shut off by the pressure of the swollen condition. The brain and spinal cord of dead sheep contained an excessive amount of serum. The muscle tissue appears normal in most parts of the body outside of the head.

#### PREVENTION.

Sheepmen recommend many methods for preventing the disease, but most of them were found to be of little use. Many flockmasters seem to think that if the sheep are driven around a locality where this affection usually attacks them, or if they are not allowed to drink from certain streams, they will ward off this trouble. There are certain areas along the trail where sheep are driven that are noted spots for the contraction of bighead. In such places the disease has been very prevalent in the past, and many of the sheepmen and herders claim that by avoiding this trail the sheep will not contract the trouble. An opportunity was afforded the writer one season to travel with the sheep over the trail where great losses had occurred in previous years. This was over the country from the winter to the summer ranges from southern Utah and Nevada to central Utah. On this trail he could daily inspect about 10,000 sheep by riding from one herd to another. During two weeks the different herds were closely observed daily, but not a single case of bighead developed, and they got entirely beyond what was known as the dangerous ground where sheep had previously contracted the malady. Near the shearing corrals two sheep were attacked, but they were mild cases and made a complete recovery.

The writer is entirely convinced that no places along the trail are more apt to cause sheep to become affected than others, but that the sun and its heat have more to do with it than any particular locality or piece of ground.

Attacks of bighead in some herds were very slight, the sheep often making a complete recovery before the writer could get to the scene of the outbreak. Invariably such herds had not been driven very hard when they contracted the condition, the herder either dropping out the affected animals or stopping with the entire herd. On the other hand, where herders continued to drive their sheep after they became affected, the trouble was more severe and the losses greater.

It was found that where sheep were properly handled on the trail, that is, not driven too long nor too fast during the hot part of the day, especially after a cold night or a storm, none of the sheep contracted bighead. Again, if some of the animals that contracted this

condition were dropped out of the herd, or the entire herd stopped and allowed to get in the shade, the affection could be overcome. If sheep are held immediately after they show symptoms of the malady, it is usually overcome in from eight to twenty hours, the animals appearing as well as at any time; while, on the other hand, if they are driven fast during the hot part of the day many contract the disease and succumb as a result.

#### TREATMENT,

Different medicinal substances were experimented with on affected sheep with the view of finding some specific that might partially or entirely overcome the trouble. Stimulants for producing vascular action, as belladonna, turpentine, iron sulphate, and strychnin sulphate, were tried, but all to no avail. For the swelling of the head such agents as sugar of lead and alum were used with some success. Internally, Fowler's solution was tried, also nuclein solution and digitalis. The substances doing the animals most good were emollients applied to the head, such as vaseline and olive oil. Whenever bighead sheep had absolute rest and some protection from the direct rays of the sun and their heads were smeared with emollients, they made a complete recovery in a short time, while those that were not treated in this manner, but were driven indefinitely without these precautions, became severely affected, many of them dying as a result.

Many shepherds practiced scarifying or cutting open the swellings, but this had a detrimental effect, as it exposed the parts to infection, dust and dirt getting into the wound and causing death from wound infection rather than from bighead.

#### CONCLUSIONS.

Bighead is a condition affecting principally the head and ears of sheep, causing them to swell to enormous proportions.

It is not a regular contagious or infectious disease, as it is not transmissible from affected to healthy sheep.

It is a condition induced by severe exertion of sheep during very warm weather, especially after a cold storm or cold night.

It attacks all kinds of sheep, young and old, male and female, but is not common among lambs.

The malady is prevented by handling sheep properly—not driving them too far or too fast on the trail during the heat, especially before shearing in the spring.

When sheep are affected they should be dropped out of the herd, or the entire band should be held and allowed rest and shade if possible.



Sheep with swelled heads should have their heads anointed with olive oil or vaseline and be kept quiet from 12 to 24 hours.

Sheep should be moved only during cooler parts of the day.

Sheepmen should not become excited when bighead develops among their flocks and force their herders to rush their sheep over the ground, as they do where poisonous plants exist. There is no particular place for bighead to develop.

Keep cool and keep the animals cool as far as possible and many great losses can be prevented.







